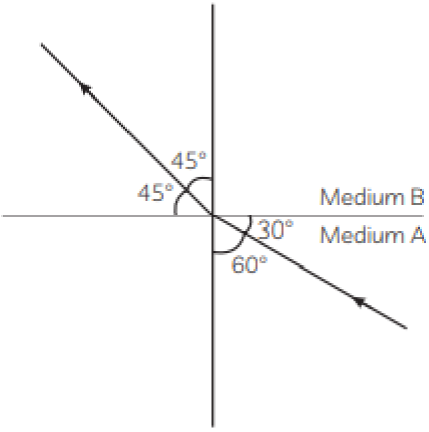
REFRACTION OF LIGHT

Based on Definition & Refraction Basics, Based on ray Diagram& application,
Glass block and Prism, Based on Numericals

1. The figure shows a ray of light as it travels from medium A to medium B. The refractive index of the medium B relative to medium A is



(a)$\frac{\sqrt{3}}{\sqrt{2}}$ (b)$\frac{\sqrt{2}}{\sqrt{3}}$ (c)$\frac{1}{\sqrt{2}}$ (d)$\sqrt{2}$

2. The refractive index of a medium depends upon:
   (a) Nature of material of the medium
   (b) Optical density of the medium
   (c) Wavelength of light
   (d) All of these

3. What is the angle of deviation?
   (a) Angle between the reflected ray and incident ray
   (b) Angle between the reflected ray and refracted ray.
   (c) Angle between the incident ray and refracted ray
   (d) Angle between the incident ray and emergent ray

Direction In each of the following questions, a statement of Assertion is given by the corresponding statement of Reason. Of the statements, mark the correct answer as

(a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
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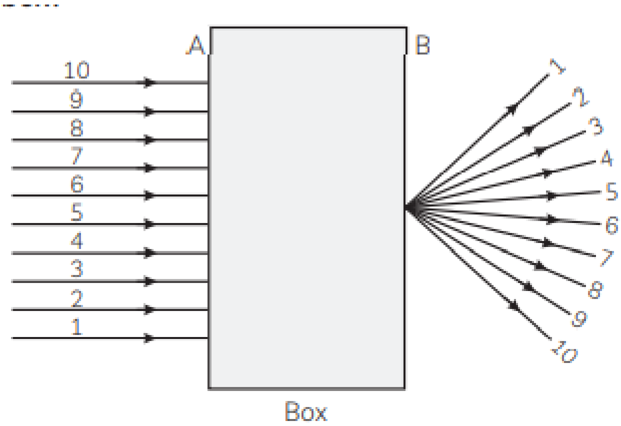
4. Assertion (A): Light travels faster in glass than in air.
   Reason (R): Glass is denser than air.

5. Assertion (A): Light does not travel in the same direction in all the media.
   Reason (R): The speed of light does not change as it enters from one transparent medium to another.

6. Assertion(A): A ray of light travelling from a rarer medium to a denser medium slows down and bends away from the normal. When it travels from a denser medium to a rarer medium, it speeds up and bends towards the normal.
   Reason (R): The speed of light is higher in a rarer medium than a denser medium.

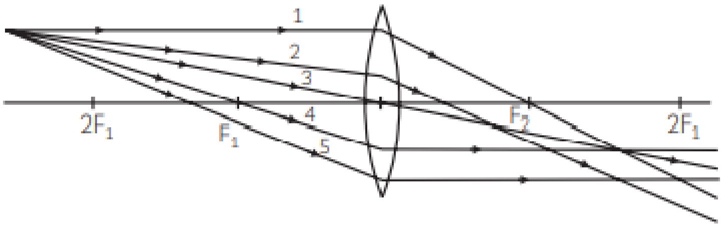
7. Assertion(A): Refractive index has no units.
Reason (R): The refractive index is a ratio of two similar quantities.

8. A beam of light is incident through the holes on side A and emerges out of the holes on the other face of the box as shown in the figure. Which of the following could be inside the box?



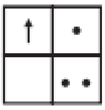
(a) concave lens (b) Rectangular glass slab (c) Prism (d) Convex lens

9. From the following diagram, select the incident rays whose paths after refraction have been correctly shown and can be used for locating the position of image formed by a convex lens

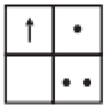


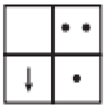
(a) 1 and 4 (b) 3 and 4 (c) 1, 3 and 4 (d) 1, 3, 4 and 5

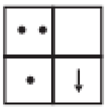
10. If you focus the image of a distant object, whose shape is given below, on a screen using a convex lens

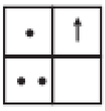


the shape of the image of this object on the screen would be:

(a)


(b)


(c)


(d)


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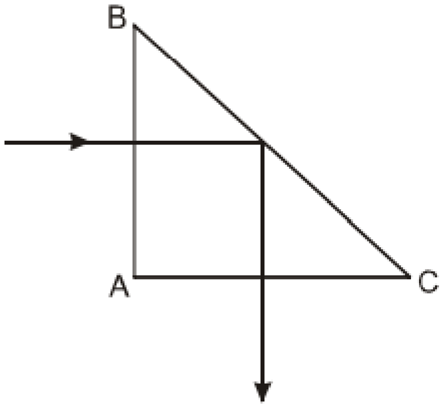
11. Assertion (A): Image formed by a concave lens is not always virtual.
Reason (R): Image formed by a lens is real if the image is formed in the direction of a ray of light with respect to the lens.

12. Assertion (A): Assertion: A convex lens has a real focus.
Reason (R): All light rays pass through the focus of a convex lens after refraction

13. Assertion (A): Power of a concave lens is negative.
Reason (R): A concave lens has a virtual focus.

14. Assertion: The object distance is the distance of the object from the lens.
Reason: It is measured from the object to the optical centre of the Lens.

15. Light enters an isosceles right triangular prism at normal incidence through face AB and undergoes total internal reflection at face BC as shown below:



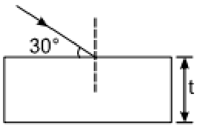
The minimum value of the refractive index of the prism is close to:

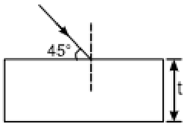
(a) 1.10 (b) 1.55 (c) 1.42 (d) 1.72

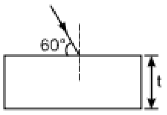
16. Consider a ray light passing through a rectangular glass slab. Let the emergent ray shift laterally by a distance the shift x depends on:

(a) angle of incidence
(B) refractive index of the material of the slab
(c) width of the slab
(d) all the above

17. In which figure lateral displacement will be larger if a ray of light of same wavelength is incident on a plane glass slab:

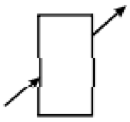
(a)


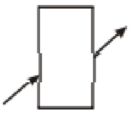
(b)


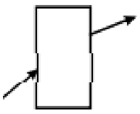
(c)


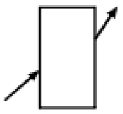
(d) Same in all cases

18. Four students showed the following traces of the path of a ray light passing through a rectangular glass slab. The trace most likely to be correct is that of student:


(a)


(b)


(c)


(d)

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19. Assertion (A): The emergent ray is parallel to the direction of the incident ray.
Reason (R): The extent of bending of the ray of light at the opposite parallel faces (air- glass interface and glass-air interface) of the rectangular glass slab is equal and opposite.

20. Assertion: Lateral displacement is the distance between incident ray and the emergent ray.
Reason: The wider the glass slab, the larger the lateral displacement

21. Assertion There is no dispersion of light refracted through a rectangular glass slab.
Reason Dispersion of light is the phenomenon of splitting of a beam of white light into its constituent colours.

22. The velocity of light in air and glass is 3×10^8 m/s and 2×10^8 m/s respectively. What is the R.I. of glass w.r.t. air?
(a) 1.3 (b) 1.4 (c) 1.5 (d) 6

23. The linear magnification for a lens is the ratio of the size of the image to the size of the object, and is denoted by m. Then m is equal to (symbols have their usual meanings) :
(a) $f / (f - v)$ (b) $(f - u) / f$ (c) $f / (f - u)$ (d) none of these